

Title: Can We Have a Dance?

Brief Overview:

Students will plan a school dance using budgetary constraints. They will use percents and proportions to predict expenses. They will use the concept of area measurement to determine the space needed for the dance and produce a scale drawing. Using comparison shopping skills, they will determine the refreshments to be served and their costs. They will write a proposal in the form of a business letter to the PTA for pre-dance funding and approval.

Links to Standards:

- **Mathematics as Problem Solving**

Students will demonstrate their ability to solve mathematical problems by deciding which information is pertinent to their particular task.

- **Mathematics as Communication**

Students will demonstrate their ability to communicate mathematically by writing a letter explaining their proposal and calculations. They will also present their proposal to the class using visual aids.

- **Mathematics as Reasoning**

Students will demonstrate their ability to make decisions on what to buy and to charge for refreshments and charge for dance tickets based upon their calculations.

- **Mathematical Connections**

Students will demonstrate their ability to apply mathematical skills to economics and use letter writing skills.

- **Number and Number Relationships**

Students will demonstrate their ability to use ratio and proportion in the construction of a scale model diagram.

- **Computation and Estimation**

Students will demonstrate their ability to perform mathematical operations with fractions, decimals, percents, money, and whole numbers by choosing an appropriate operation to solve a problem. They will have to determine if a solution is reasonable.

- **Statistics**

Students will demonstrate their ability to collect and organize data (tables, charts, and advertisements) and to analyze data to justify a real-life problem.

- **Geometry**

Students will demonstrate their ability to calculate area and convert units within the customary system of measurement.

- **Measurement**

Students will demonstrate their ability to select the appropriate unit of measure.

Grade/Level:

Grades 7-8

Duration/Length:

This activity should take 5 days including the assessment. The activity may take longer than anticipated depending on class duration and students' prior knowledge.

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Using ratios and proportions to create a scale drawing or find a unit price
- Be able to calculate area
- Convert units of measure
- Determine percent of a number
- Solve problems using money
- Collect/analyze data and create graphs using data
- Perform mathematical operations using whole numbers and decimals
- Write a business letter
- Use a computer to create spreadsheets, graphs, or letters (optional)

Objectives:

Students will be able to:

- create a visual representation of the costs, broken into major sub-categories. Types of representations can include: spreadsheets, tables, graphs, and charts (Day 3).
- work cooperatively in groups (all days).
- analyze data from a table (Day 1, 3, 4).
- make a scale drawing (Day 1 and others as necessary).
- make decisions based on budgetary constraints (all days).
- make decisions using unit pricing (Day 3).
- make accurate calculations using appropriate units of measurement (all days).
- submit a proposal in the form of a business letter with worksheets as supporting documents (Day 4).
- perform the calculations to determine the cost of music (Day 2).
- use problem solving skills and reasoning to choose the source for the music (Day 2).
- justify, in writing, your choice for the music (Day 2).
- Justify their group scale drawing of the floor plan for the dance (Day 4).
- explain the way they determined the best buy by comparison shopping for the refreshments their group has chosen (Day 3).
- tell what their group would like to do to decorate the gym (Day 4).
- explain the breakdown of costs as shown in graph or chart (Day 3 and 4).

Materials/Resources/Printed Materials:

- Pencils
- Papers
- Rulers
- Calculators

- Colored markers
- Graphing paper
- Statement of Problem sheet
- Computer with printer (optional)

Development/Procedures:

Day 1:

- Present the problem to the class. Allow them enough time to clarify any questions they may have.
- Organize the class into groups of 3 or 4. Pass out Day 1 worksheets, calculators, and rulers. Discuss how to calculate the area. Review ratio and proportions briefly. They need to show the outline of their calculations for determining total attendees at the dance. Students must allocate responsibilities for the price comparison shopping trips by the end of the period. The comparison shopping trips will be completed as homework. Hand out Day 1 Homework worksheet at the end of class and explain assignment. Students must complete their price checking by Wednesday (Day 3).

Day 2:

- Form students into their work groups. Pass out Day 2 worksheet. Review directions. Monitor and assist as required. Students should be able to complete work by class end. If necessary, the floor plan scale drawing may be completed during this class. Check progress of Day 1 homework assignment. Remind students that pricing task is due tomorrow.

Day 3:

- Tell students to get out Day 1 Homework worksheet. Students will complete their choosing of which refreshments to buy. They will create a visual representation which shows: anticipated income sources, categories of expenses, and predicted profit. This can be done in the form of a graph, table, or spreadsheet. They should include an outline of their calculations used to produce the number totals in the representation.

Day 4:

- Read the writing prompt to the class.
- Students will independently create a draft of their business letter using their scale drawings and visual aids developed by their groups. They will write the final copy for homework in pen or they will type it. Provide computer access if possible.
- Provide modified prompts with graphic organizers for special education students who need more structure in organizing their thoughts. Provide dictionaries, spelling dictionaries, Franklin Spellers, or spell check as appropriate.
- Periodically remind students of time left to complete rough drafts. Note: This activity should take between 60 and 90 minutes of class time.

Day 5:

- Students will organize their packet of information. Students must submit their package by the end of class.

Performance Assessment:

Students will be observed throughout the lessons for group participation and cooperation. Worksheets will be assessed using a scoring guide on a daily basis. Each student's packet (includes letter and supporting documentation) will be scored using a scoring rubric found in the resource section.

Extension/Follow Up:

Students will plan the layout for the school's spring carnival. They must decide how the carnival is to be laid out on the school's football field.

Authors:

Francis T. Julia, Jr.
Governor Thomas Johnson M.S.
Frederick, MD

Patricia Plummer
New Market M.S.
Frederick, MD

Brenda Schroeder
Brunswick M.S.
Frederick, MD

Cindy Zang
Middletown M.S.
Frederick, MD

CAN WE HAVE A DANCE? - PROBLEM

You and your friends think it would be fun to plan a school dance. You know that in the past the PTA has allowed classes to have school dances and has given them money to pay the up front costs. You also know that for the last dance, the PTA gave the 8th grade class \$1500.00 to cover initial costs. The class then paid the PTA back with the income they made from the dance ticket sales. Therefore, you and your friends think it is reasonable to ask the PTA to help you out with dance costs, too. From the \$1500.00, you will have to cover the costs of the band and refreshments and set aside \$100.00 to cover the cost of decorations.

You think it would be sensible to have the dance in the school gym because it would not cost anything for its use. Dances are traditionally held from 3:00 P.M. to 5:30 P.M. when they are held at the school.

You will have to decide how much to charge for tickets in order to be able to pay back the PTA. You decide that refreshments will be included in the cost of the ticket, so the students will not have to pay extra for snacks.

You and your friends decide that the best way to start is to make a scale drawing of the floor plan, create a plan of what you would need for the dance, develop a budget, and to then present the entire plan to your class for their feedback. Finally, you will present the plan to the PTA president in the form of a business letter, with the visual aids used in your class presentation.

DAY ONE
Floor Plan

Task One

You and your friends have decided to plan a dance for your school. Your principal has agreed to let you use the gym. However, only $\frac{3}{4}$ of the space in the gym will be usable for dance space since $\frac{1}{4}$ is currently occupied by equipment. The gym is 70 ft. by 80 ft. Since there is a very strict fire code, you have been told that you can have only 5 people per every 20 square feet of dance floor. One of your tasks will be to find the number of students who can attend the dance. You must remember that 20% of the usable floor space will be used by the disc jockey or band. Another 10% will be used for the refreshment area. Five percent of the floor space will be reserved for chairs for chaperones. The rest of the floor space will make up the dance floor as defined in the fire code.

How many students can attend the dance? Show the outline of your calculations below as you work to answer that question.

1. Find the total area of the gym.
2. What area of the gym will be usable space for the dance?
3. Complete the chart below.

Reserved Areas	Percent of Area	Actual Area
DJ or Band		
Refreshments		
Chaperones		
Totals		

4. Compute the area of the dance floor. Answer in a complete sentence.

5. According to the fire code standards, find how many students can attend your dance. Justify your answer in a complete sentence.

6. Now that you know how many students can attend, determine how much you have to charge for each ticket to cover the \$1500.00 that the PTA is loaning you. Show an outline of your calculations below.

Scale Drawing

Task Two

Your second task will be to make a scale drawing of the gym. You will need to use the grid that is included. Use only geometric figures (triangles, squares, etc.) in your design. In your drawing you must include and label the following:

1. Equipment area
2. DJ or band area
3. Refreshment stand
4. Chaperone chairs
5. Scale (displayed on drawing)
6. Dimensions of the four areas above

Show the outline of your calculations below for computing the scale measurements for each of the four areas. State the scale that you used in your drawing.

Equipment Area Measurement	DJ or Band Area Measurement
Refreshment Stand Measurement	Chaperone Chairs Measurement

DAY ONE - ANSWER KEY
Floor Plan

Task One

You and your friends have decided to plan a dance for your school. Your principal has agreed to let you use the gym. However, only $\frac{3}{4}$ of the space in the gym will be usable for dance space since $\frac{1}{4}$ is currently occupied by equipment. The gym is 70 ft. by 80 ft. Since there is a very strict fire code, you have been told that you can have only 5 people per every 20 square feet of dance floor. One of your tasks will be to find the number of students who can attend the dance. You must remember that 20% of the usable floor space will be used by the disc jockey or band. Another 10% will be used for the refreshment area. Five percent of the floor space will be reserved for chairs for chaperones. The rest of the floor space will make up the dance floor as defined in the fire code.

How many students can attend the dance? Show the outline of your calculations below as you work to answer that question.

1. Find the total area of the gym.

$$70 \times 80 = 5600 \text{ square feet}$$

2. What area of the gym will be usable space for the dance?

$$\frac{3}{4} \times 5600 = 4200 \text{ square feet}$$

3. Complete the chart below.

Reserved Areas	Percent of Area	Actual Area
DJ or Band	$.20 \times 4200$	840 square feet
Refreshments	$.10 \times 4200$	420 square feet
Chaperones	$.05 \times 4200$	210 square feet
Totals	$.35 \times 4200$	1470 square feet

4. Compute the area of the dance floor. Answer in a complete sentence.

$$4200 - 1470 = 2730 \text{ square feet} \quad \text{The area of the dance floor is 2730 square feet.}$$

5. According to the fire code standards, find how many students can attend your dance. Justify your answer in a complete sentence.

$$(2730 / 20) \times 5 = 682.5 \text{ people}$$

There will be 682 people that can attend because of the fire code another person cannot attend.

6. Now that you know how many students can attend, determine how much you have to charge for each ticket to cover the \$1500.00 that the PTA is loaning you. Show an outline of your calculations below.

$$\mathbf{\$1500 / 682 = \$2.19941349 = \$2.20 \text{ per person}}$$

SCALE DRAWING

Task Two

Your second task will be to make a scale drawing of the gym. You will need to use the grid that is included. Use only geometric figures (triangles, squares, etc.) in your design. In your drawing you must include and label the following:

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Show the outline of your calculations below for computing the scale measurements for each of the four areas. State the scale used in your drawing.

Equipment Area Measurement	DJ or Band Area Measurement
Refreshment Stand Measurement	Chaperone Chairs Measurement

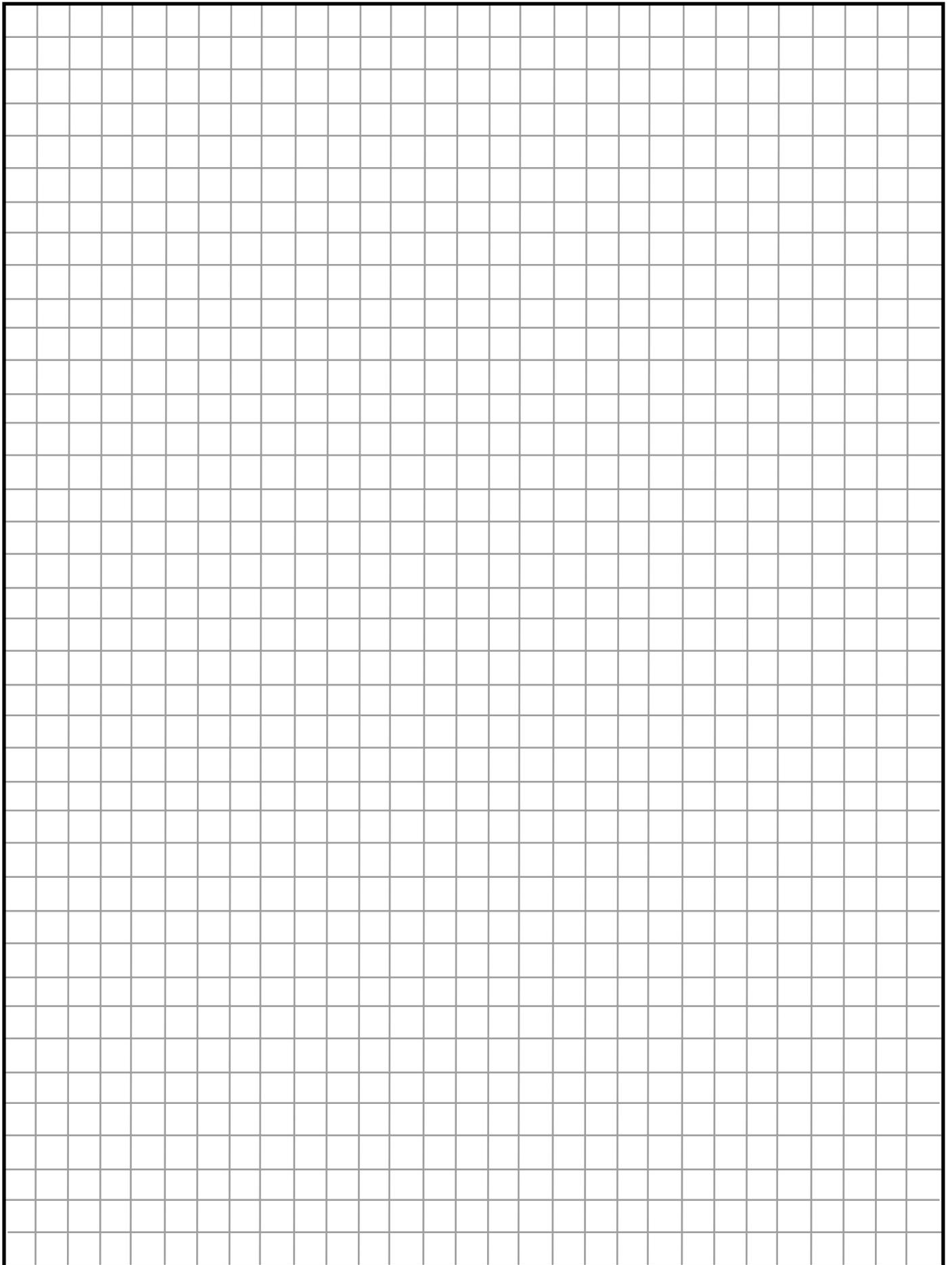
DAY 1
SCORING KEY

Score student group scale drawings using the following key:

- 5 pts. - Meets all of the following criteria.
- 4 pts. - Meets four of the following criteria.
- 3 pts. - Meets three of the following criteria.
- 2 pts. - Meets two of the following criteria.
- 1 pt. - Meets only one of the following criteria.

Criteria for grading:

- All 4 areas shown and labeled
- Measurements labeled on drawing
- Scale displayed on drawing
- Accurate measurements used in scale drawing
- Neatness and effort evident in drawing



DAY 1 - REFRESHMENTS

HISTORICAL INFORMATION: In the past the average number of students has been around 600. There have been 15 dozen ice cream bars (sandwiches, nuttybuddy or dreamsicles), 80 gallons of soda, 45 pounds of chips, 30 pounds of pretzels, 130 pounds of candy and 50 pounds of cookies.

Your homework assignment is to research the cost of specific food items at Giant and Safeway, compare the unit price for specific food items and choose the store that offers the best price (the least expensive). The items you will be researching are : soda, chips, pretzels, cookies, candy and ice cream bars. You are to assign two members of your group to go to Giant and the other two go to Safeway. This assignment will be due on Day 3 of the Project.

Supermarket #1		Supermarket #2		Supermarket #3	
Item	Unit Price	Item	Unit Price	Item	Unit Price
1)				Soda	\$.01/oz
2)				Chips	\$.15/oz
3)				Pretzels	\$.11/oz
4)				Candy	
				Milky Way/Snickers	\$.21/oz
				Kit-Kat/Reese's Cup	\$.28/oz
5)				Cookies	\$.05/oz
6)				Ice Cream	
				Nutty Buddy	\$1.99/6pk
				Sandwich	\$1.89/dz
				Creamsicle	\$1.99/dz

Add your supporting calculations for the unit pricing on another sheet and hand in with your presentation.

SCORING RUBRIC FOR DAY 2
MUSIC SELECTION

- 2** - Student has included cost of music, how long they will play and reasoning supported with calculations for their choice.
- 1** - Student has made an attempt, shows some understanding of the problem but made minor calculations or did not support choice with reasoning stated and/or calculations.
- 0** - Student made no attempt to write response.

Day 3: Worksheet

Using Day 1 homework sheet each group will make final decisions of refreshments to buy. Create a visual representation (graph, table, etc.) showing their choices.

Write an explanation of your decision using complete sentences.

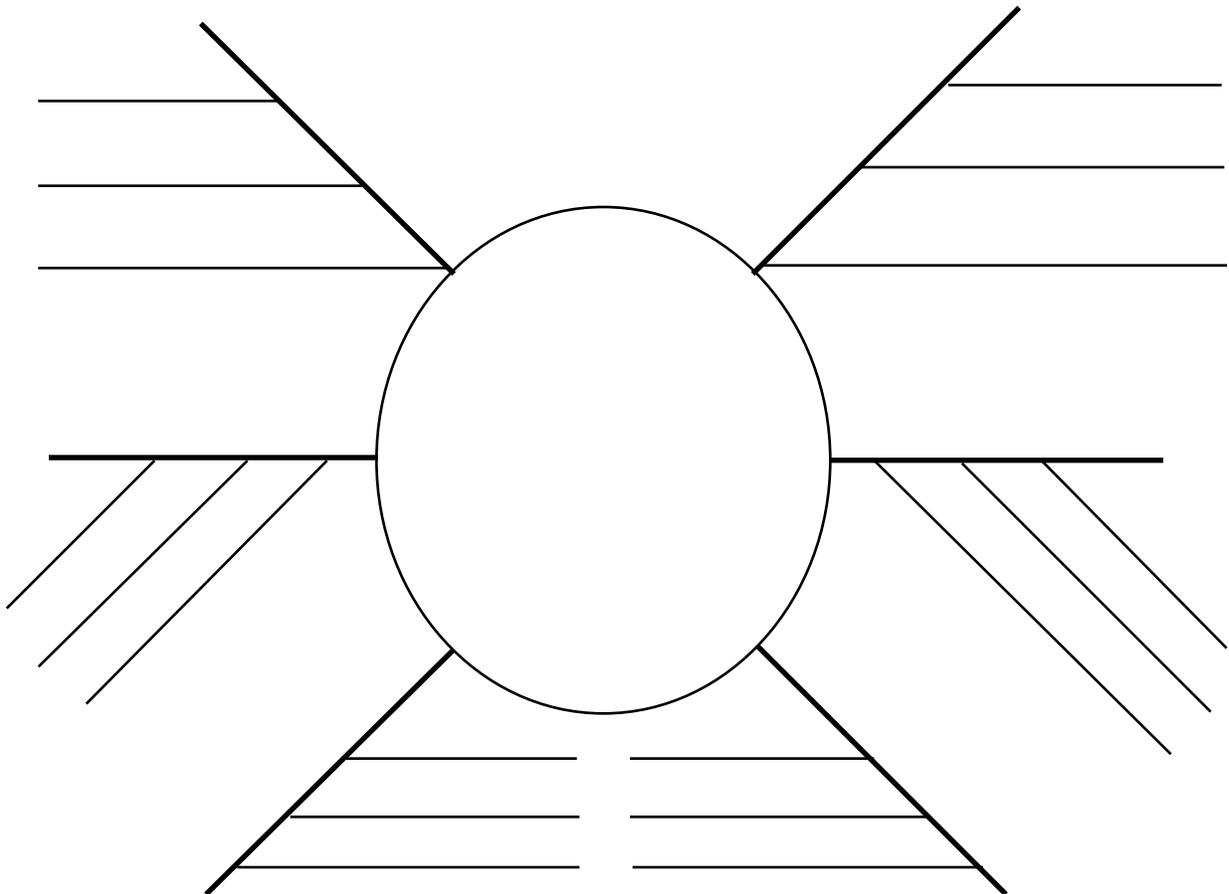
DAY 4: BUSINESS LETTER TO PTA

Suppose your class decided that they would like to hold a school dance. After making plans with your classmates for the dance floor plan, types of music and refreshments, and total costs of the dance, you decide that you want to write a proposal to the PTA president asking her to consider funding your class dance.

Before you begin to write, think about how you could justify your floor plan for the dance. Think about what kind of music you would like to have and why you chose that kind. Think about the types of refreshments your class has chosen and how you determined which store would have the best prices for these items. Think about the types of decorations your class would like to have. Think about how you could explain your visual display of the total costs to the PTA.

Now write a business letter to the PTA president asking her to consider funding your class dance. Be sure to edit your letter for correct capitalization, punctuation, spelling, usage, and grammar. Type or write your final draft of the letter neatly in pen.

Use the space below to make a graphic organizer for your letter.



DAY 5
STUDENT PRESENTATIONS

Instructions to Teacher:

- Students will present their group decisions to the class. This will be an ungraded presentation. However, every student will be expected to contribute in some form. Visual displays and scale drawings will be explained to the class.

Extension Activity Can We Have A Spring Carnival?

Your planning of the school dance was so successful that the principal and PTA have requested that your group plan the layout of the spring carnival. In the past the placement of the different booths has caused many problems (crowding, damage to the grass, and confusion as to where the events are located).

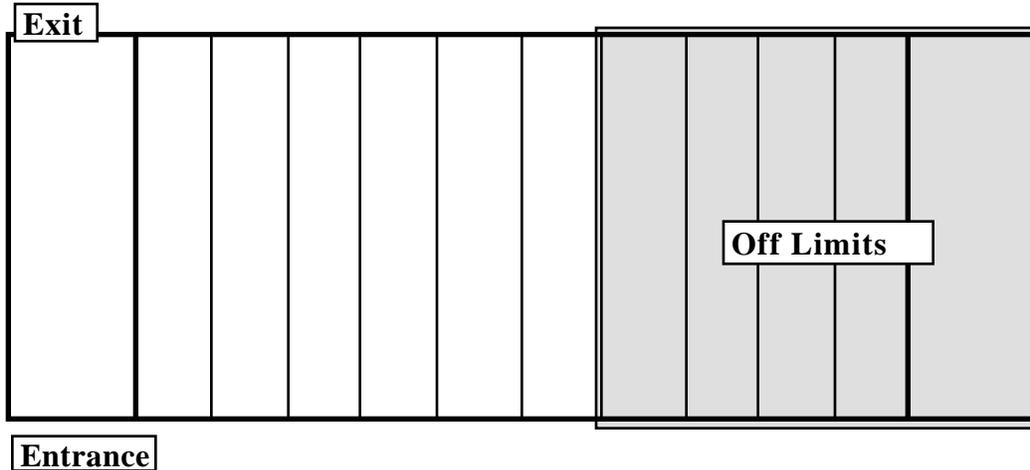
The principal has provided you a sketch of the school's football field which shows its dimensions and locations of existing areas which may be used for the carnival and which areas may not be used.

You must create a scale drawing of the carnival site which must include space for the following activities:

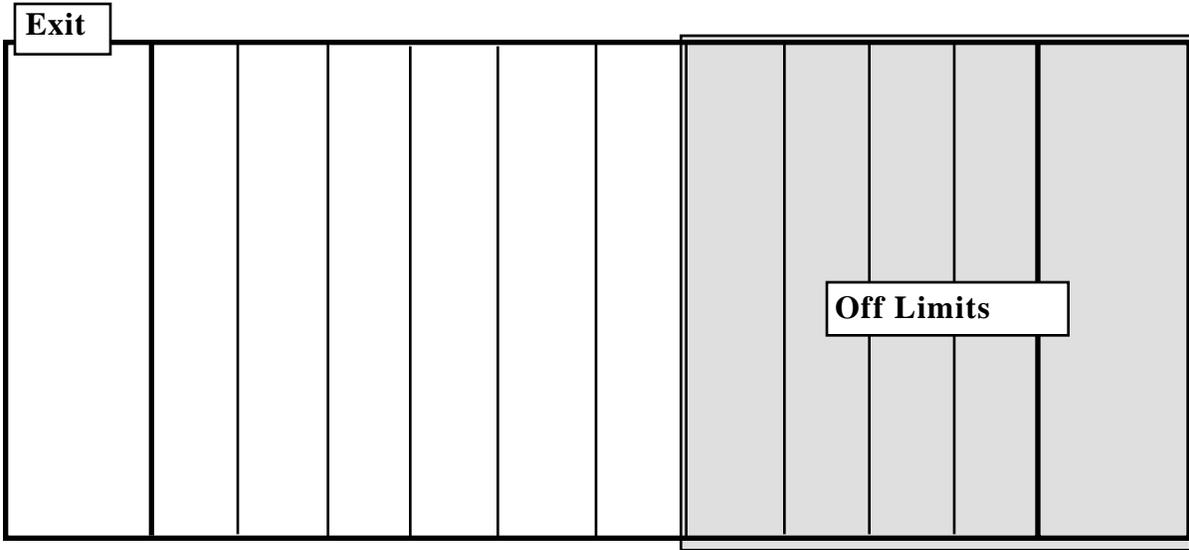
- | | |
|---------------------|----------------------------------------|
| Bathroom locations | Entrances and Exits |
| Ring Toss Game | Basketball Throw Game |
| Food Booth | Balloon Dart Throw |
| Win a Goldfish Game | Dunking Booth |
| Three legged race | Soccer Kick Game(can use double space) |
| Walkways | |

Each activity booth can use up to 240 square feet of space.

Attach to your drawing the outline of your calculations which you used to determine the dimensions for each activity.



Length = 360 feet
Width = 150 feet



Entrance

Length = 360 feet
Width = 150 feet

Scoring Rubric for Extension Activity
Can We Have A Spring Carnival?

- | | |
|--------------------------------------------------------------------------------------|------------------|
| 1. Scale drawing is labeled with a reasonable scale. | 1 point |
| 2. Drawing of the field is accurate and shows entrances, exits, and off-limit areas. | 1 - 3 points |
| 3. Each activity area is depicted on the drawing. | 1 point per area |
| 4. Each activity area is drawn to the correct scale. | 1 point per area |
| 5. All calculations are shown clearly with no more than 2 minor arithmetic errors. | 10 points |